

Acoustic investigation of gas seeps on the NE Sakhalin continental slope, Sea of Okhotsk

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On the northeastern Sakhalin slope in the Sea of Okhotsk, there have been found a lot of gas hydrate-related phenomena like active gas/fluid venting sites at the seafloor, methane releases into the water column, and massive gas hydrate deposits. Within the frameworks of CHAOS (2003, 2006) and SSGH projects (2007), acoustic surveys including side-scan sonar (SSS), sparker high-resolution seismic, echosounding survey were conducted in the area (53°56' N, 143°52' E to 54°40' N, 144°32' E). SSS mosaic covering the area shows that about 130 seabed structures with high backscatter intensity. The structures are divided into two groups by shape, subbottom structure, and occurrence depths. Most of them are circular and widely distributed in the slope shallower than 1000 m water depth, while the rest are linear and angular appearing in the flat basin area deeper than 1000 m. The circular structures with diameters ranging from 100 m to 800 m are interpreted to be gas seeps, and the angular ones turned out seafloor undulations. Sparker seismic profiles reveal very shallow top of BSR at 300 m water depth and the BSR is quietly disturbed by gas chimney structures below active gas seeps. Most gas flares detected by echosounder take place in/around gas seeps. Sparker and echosounding survey are very efficient methods to identify whether gas seeps are active or not.